GARDEN AND FOREST.

PUBLISHED WEEKLY BY

THE GARDEN AND FOREST PUBLISHING CO.

OFFICE: TRIBUNE BUILDING, NEW YORK.

Conducted by . . . . . Professor C. S. SARGENT.

ENTERED AS SECOND-CLASS MATTER AT THE POST-OFFICE AT NEW YORK, N. Y.

NEW YORK, WEDNESDAY, MARCH 13, 1895.

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The Forests of the Wabash Valley.

THE composition of the remarkable forests which, in spite of the terrible inroads that have been made in them during the last twenty-five years, still cover considerable portions of the region in southern Illinois and Indiana watered by the Wabash River and its tributaries, was first made known to the scientific world by a paper published in 1882 in the fifth volume of the *Proceedings of the United States National Museum*, by Dr. Robert Ridgway, the ornithologist of the Smithsonian Institution.

Dr. Ridgway was born in Mount Carmel, on the banks of the Wabash River, nearly opposite the mouth of White River, and his early work in his chosen field of science brought him into familiar intercourse with the trees of that region, which he has studied faithfully and lovingly whenever opportunity offered until the present time. By a piece of very great good fortune his investigations have, moreover, been supplemented by those of another naturalist, Dr. Jacob Schneck, who for many years has lived in Mount Carmel and has also been specially interested in trees. The result of this fortunate association has been that the forests in the neighborhood of the mouth of White River have been more carefully studied than those in any other spot of equal interest west of the Allegheny Mountains. Other regions with a similar climate and with as good soil can be found in western Kentucky and Tennessee, in south-eastern Missouri, eastern Arkansas, and in the delta of the Yazoo in western Mississippi, and may, perhaps, produce as remarkable individual trees in as great a variety of species, but none of them have been as carefully studied, and, until some other forest containing a greater variety of trees and larger individuals can be found, that of the lower Wabash valley must be considered the most remarkable aggregation of trees in the north temperate zone. On the western slopes of the Big Smoky Mountains, in Tennessee, there are wonderful trees in great variety, and individuals of some species, although not so tall, probably, produce in that forest their largest trunks; and in climbing about four thousand feet from the banks of the little Tennessee, in North Carolina, to the summits of these mountains one can count nearly fifty arborescent species, although individual trees are smaller than on the western flank of these mountains.

In a second paper on the Wabash Silva, recently published in the seventeenth volume of the *Proceedings of the National Museum*, Professor Ridgway shows that the number of indigenous arborescent species in the Wabash valley south of the mouth of White River is one hundred and seven, or more than a quarter of all the arborescent species in North America north of Mexico, and even this number can be slightly increased, as one or two species of Crataegus, overlooked by Professor Ridgway, grow near Mount Carmel.

Some idea of the surprising richness of the forest-flora in this region can be obtained by an examination of Dr. Ridgway's list of trees growing on restricted areas. On a tract of seventy-five acres he found fifty-four species of trees, and another of twenty-two acres contained forty-three species. On a tract of forty acres one mile south-east of Olney, in Richland County, Illinois, what the author modestly calls an imperfect survey of the woods shows thirty-six species. The nearest approach to such a concentration of tree species in a restricted area is in central Yezo, where Professor Sargent found sixty-two species and varieties of trees growing in the immediate neighborhood of Sapporo at practically one level above the sea.

The height attained by these Wabash valley trees is as remarkable as the number of species in the forest. Individuals of forty-two species reach a height of one hundred feet, and those of twenty-one species grow to the height of one hundred and thirty feet. Individuals one hundred and fifty feet high of thirteen of these species have been measured. A specimen of Quercus Texana, called Quercus coccinea by Dr. Ridgway, the tallest of the Wabash Oaks, and, perhaps, the tallest Oak in North America, measured one hundred and eighty feet, and a Tulip-tree one hundred and ninety feet; a Pecan, the tallest Hickory, one hundred and seventy-five feet; a Cottonwood (Populus monolifera), one hundred and seventy feet; a Bur Oak (Quercus macrocarpa) one hundred and sixty-five feet; while, in addition to the trees already mentioned, a Liquidambar and a Black Oak attained a height of one hundred and sixty feet. The size of the trunks of some of these trees, measured at three feet above the surface of the ground, is hardly less remarkable than their height. A Sycamore (Platanus occidentalis) girted thirty-three and a third feet; a Tulip-tree twenty-five feet; a White Oak twenty-two feet; a Black Walnut twenty-two feet; a Black Oak twenty feet, and a Texas Oak twenty feet. In comparison with such trees, the inhabitants of eastern forests, where trees one hundred feet tall are extremely rare, appear like pigmies, and persons familiar only with forests of the Atlantic seaboard can form no idea of the magnificence of these trees, the last remaining vestiges of the forests which covered the valley of the Mississippi when the white man first floated down its placid waters.

This region is the home of some of our most beautiful and valuable trees. On the bottom-lands of the rivers the Pecan and the great western Hickory (Hicoria laciniosa) grow with all the Swamp White Oaks, the Pin Oak, the Texas Oak, and that remarkable form of the Spanish Oak, which, usually an upland tree, sends up on these bottom-lands a tall, beautiful shaft covered with pale bark, which might readily be mistaken for the trunk of one of the White Oaks. The illustration on page 104, made from a photograph, for which we are indebted to Dr. Schneck, represents one of these trunks. The attention of scientific men is first called to this variety in Professor Ridgway's second paper, although it has long been known to southern lumbermen. Common in the Yazoo delta and in eastern Arkansas, and not rare in northern Alabama and western Florida, it is valued as a timber-tree, and is said to produce wood equal to that of the White Oak. In the Wabash valley the southern Cypress (Taxodium), the Water Hickory, the Water Locust and the Planer-tree, all denizens of the south, find their northern homes, and there the rare Swamp Cottonwood grows to its largest size, and the Catalpa displays its greatest beauty. In these lowland forests great

lianes festoon the trees, and Dr. Ridgway tells us of Grapevines with stems more than a hundred feet long and more than a foot in diameter, and of Aristolochias, Poison Ivies and Bignonias nearly as large. No other American forest-scene is more beautiful, and certainly no other forest of deciduous trees, for it must be remembered that in all this great collection of trees there is not a single species with evergreen leaves, is more interesting. A view in one of these bottom-land forests, with masses of the Virginia Creeper clothing the trunks of the trees, appears in the illustration on page 105 of this issue, made from a photograph, for which we are also indebted to Dr. Schneck. No picture, however, can give an idea of the stateliness and grandeur of these noble trees, or of the luxury of the annual and perennial plants that cover the forest-floor with almost impenetrable thickets.

In ending this brief notice of Dr. Ridgway's most interesting and important contribution to dendrological science, we cannot refrain from the hope that equally well-trained and enthusiastic observers may appear to study the composition of other forest-regions in the Mississippi basin before the demands of a larger population destroy the noblest deciduous-leaved trees that the eyes of man have rested on.

The most encouraging sign that the time is approaching when our wasteful methods of lumbering will give place to something like an intelligent system of forestry, is the attitude of the lumbermen and the lumber-trade journals. Only a few years ago anything like a criticism of the prevalent methods of clearing away the woods was resented and sneered at as sentimental, and any prediction that the timber supply could be exhausted within a given number of years was attributed to ignorance. In these days, however, we expect to see in the lumber-trade journals sound advice about forest-preservation, and the lumbermen, whose business it has been to cut and market timber, are now thoroughly alive to the fact that they must look forward and provide for the future as well as for the present. All this was clearly shown at a late meeting in Boston of the vigorous Northeastern Lumbermen's Association. After the inevitable banquet of such occasions the keynote of the most effective speeches was "the slaughter of the forests must be diminished." Mr. George B. James, who presided, affirmed that the output of New England forests depends upon their intelligent management; that under proper forestry conditions the supply of lumber may be continued for many years to come; without proper management their market value is soon destroyed and generations must elapse before timber can be reproduced upon land that is stripped of every vestige of growth. When lumbermen clearly apprehend that the future of their business depends on the care with which our forest-resources are husbanded, we can begin to hope that the end of useless forest-destruction is at hand.

Notes on the Distribution of the Yellow Pine in Nebraska.

THE central portion of Nebraska is occupied by a peculiar region covering fifteen to twenty thousand square miles, known as the Sand Hills, now practically treeless, except in the deep cañons, and made up of an undulating surface of grass-covered sand, not infrequently consisting of deep valleys bordered by very steep hills from two to four hundred feet high.

A somewhat prolonged study of these Sand Hills has led me to the inquiry whether they have always been treeless. They bear no little resemblance to many regions still covered with Pines in other portions of the United States. I have traveled for days through Pine-forests in Michigan, which if denuded of trees would be much like our Sand Hills, both as to soil and surface configuration. It is not impossible that forests formerly covered the Nebraska Sand Hills, as in places they still do the sand hills of Michigan.

As we pass up the cañons of the larger streams we find trees. These are mainly of eastern species, and it is possible that they migrated hither, and never spread from the narrow cañons. This appears to have been the opinion of Hayden and many other of the early explorers of the Plains, and I think it is still the prevailing belief that these hills were always destitute of forests. Let us, however, consider the following facts:

(1) There are many isolated cañons which contain trees. This suggests that either (*a*) the seeds of these trees must have been distributed by birds or winds, or (*b*) a former more general distribution. It is not probable that birds and winds carried the seeds to these cañons. The physical barriers are often too great to warrant us in assuming that birds were the agents in distributing the seeds from which sprang the forests in isolated cañons. Nor can we assume that winds carried the seeds. We are forced to assume that the forest-areas must have formerly been more extended, sufficiently so to connect these isolated cañon forests with one another.

(2) There are in these cañons western as well as eastern trees and shrubs.

This fact is significant, as it requires some further explanation of the origin of the present cañon flora. These western trees and shrubs could not have reached their present stations unless conditions favorable to forest-vegetation were formerly much more general than now.

(3) The Yellow Pine, Pinus ponderosa, var. scopulorum, of the Rocky Mountains, now grows with other trees upon the hills of Pine Ridge from the Wyoming line, in Sioux County, to the Dakota line, in Sheridan County.

In this region there are eastern and western trees, and they are growing upon the hilltops as well as in the valleys and cañons. I have seen hundreds of trees of Yellow Pine growing here upon the open hillsides and upon the most exposed buttes.

(4) The Yellow Pine is now to be found in the cañons of the Niobrara River and its tributaries as far east as the border of Holt County.

In the cañons the Pines are growing thriftily, and in many places young trees are springing up abundantly. Several years ago I saw such a new growth of Pines in the northern part of Brown County, where the cañons are still full of fine healthy Pine-trees. There is nothing in these cañon Pines to suggest that conditions are now less favorable than they formerly were, but when one studies the borders of the cañons carefully, evidence is not wanting to the contrary. Here trees are found upon the most exposed points and crags, where it would now be practically impossible for them to obtain a foothold. Many of them are evidently the veterans holding desperately the stations otherwise practically abandoned by the species in its losing fight against unfavorable conditions.

(5) The Yellow Pine extended eastward along the North Platte River and the Lodge Pole Creek to Deuel County, until the pioneers destroyed them forty or fifty years ago.

In some places this destruction has been so complete that scarcely a trace now exists of the Pines. Nothing could better illustrate the rapidity with which all traces of these trees may disappear than their history along these two western streams.

(6) The Yellow Pine grew in considerable quantities in at least one station on the Republican River until destroyed by the early settlers.

Until within a few months it was generally supposed that the Yellow Pine never had grown naturally in the Republican valley. Last fall Mr. E. M. Hussong, of Franklin, in Franklin County, found several decaying stumps of Pine on the south side of the river, near the town, and upon close inquiry learned from the oldest settlers that in the early days small Pine-trees had been dug up in the cañons and on the bluffs and transplanted to dooryards and gardens, while the large trees were taken for fuel and fencing

purposes. That the Yellow Pine was a native tree at this point is proved beyond question, and we are led to suspect that an equally careful search will show its former existence in other places in the valley.

(7) In the Loup Valley there are Yellow Pines on the South Loup, Middle Loup and North Loup Rivers.

These occur in widely isolated cañons, which have no forest connection with one another. Since all the branches of the Loup head in the Sand Hills, the occurrence of Pine on their borders is very suggestive.

(8) Logs and fragments of Yellow Pine-trees occur here and there in the Sand Hills.

A few years ago an old hunter at Norfolk told me that he had frequently found old pine logs in tramping over the Sand Hills, and that these had often served to make his camp-fire. Professor Bruner a few years ago saw a settler's wagon in the south-western part of Holt County on which were fragments of pine wood cut from a pine log found on the top of one of the hills. Professor Samuel Aughey also, who traveled over the state a great deal in the early days before the hunters had used up all these fragments for fuel, states that he has repeatedly found such logs or fragments.

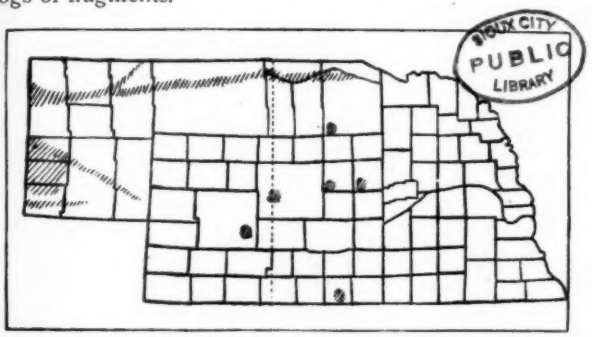

Fig. 15.—Present and past distribution of Yellow Pine in Nebraska.—See p. 102.

Now, add to the foregoing facts another which but recently came to light, and which shows that in places from which all external traces of the Pine have disappeared they may have existed in comparatively recent times. A few weeks ago Mr. I. A. Fort, of North Platte, placed in my hands a fragment of a pine stump dug out of the ground in Conroy Cañon, in Lincoln County (on section 17, township 11, range 27), about fifteen miles south and eighteen miles east of the city of North Platte. This is about one hundred miles east of its range on the Platte River as hitherto known, and in a locality in which the former presence of Pine was unexpected. Putting all these facts together (see map), I feel warranted in concluding that the area of Yellow Pine in this state must have been formerly much greater than it is to-day. I think I can safely say also that it is reasonably probable that the Sand Hills were once wooded with the Yellow Pine.

Lincoln, Neb. *Charles E. Bessey.*

Troublesome Grasses in Southern New Jersey.

THE Grasses are, by far, the most important order in the vegetable kingdom, yet we find even in this well-regulated family many species that are worthless, and others that are worse than worthless—actually vicious. Like most noxious weeds, our troublesome grasses are mainly foreigners. The Crab-grass, Eleusine Indica, as its name indicates, comes from the east, and is a nuisance in newly formed lawns and in dooryards generally. It has ascending wiry stems and is not at all handsome. Another species, E. Ægyptiaca, has a more creeping habit; it runs along, rooting at the joints as it goes. It often gets into Currant rows and among other small fruits. I have seen a single plant some yards in length. Sometimes it climbs up into the bushes among which it grows. In uprooting it, if a single joint is left a new plant is speedily formed. Fortunately, both this and E. Indica are annuals and more easily subdued than if they ha per ennial roots.

The Couch-grass, Agropyrum repens, is naturalized from Europe, and is one of our worst perennials. It increases rapidly by long running root-stocks. We have several forms of this species which seem to be indigenous. It is one of the most troublesome weeds in southern New Jersey, especially near the coast. Our Wheat, Agropyrum vulgare, belongs to this genus, the good and bad being often closely related in the vegetable as well as in the animal kingdom. Cheat, or Chess Bromus secalinus, is very troublesome here, especially in half-neglected orchards and vineyards. Last year I noticed whole acres completely covered. This, too, comes from Europe, and it is pretty well known everywhere. Two or three species of Foxtail Grass are troublesome in cultivated grounds, all of which are from Europe.

The Bermuda, or Scutch Grass, Cynodon dactylon, is not pretty on our lawns, as it is a coarse, creeping, much-branched grass, and difficult to eradicate where it gets a firm foothold. It is a perennial and also comes from Europe, and is sometimes cultivated for pasturage. I am sorry to say that one of the most pernicious of all our grasses, the Bur-grass, Cenchrus tribulodes, is a native of southern New Jersey. In neglected places, and in vineyards and orchards which are plowed only once or twice a year, this pest is almost unbearable. Several years ago I became possessor of a place some five acres in extent, mostly in fruit—vines and trees—which had been neglected for years. The entire place was almost literally covered with Bur-grass, and it has been a continual war of extermination ever since. Some three acres of Grape-vines were uprooted and put into civilized grass, which has effectually routed it from that quarter, and an acre or more was put into lawn-grass, which has about eradicated it here. But the sharp-barbed burs which cover the seeds are everywhere, and the plants steal in among Currant and Gooseberry rows and wherever they can find a bare spot that is not often stirred. This terrible pest extends all along the coast and about the great lakes and rivers to the southwest as far as southern California.

Two other species of this Bur-grass occur in southern and lower California. Cenchrus Palmeri has more wicked-looking spines than ours; when young it is greedily eaten by cattle, but they give it a wide berth as soon as the involucres harden, and the injury caused by its burs more than outweighs its value as a forage-plant. C. myosuroides is another species growing in the south-west. This is less objectionable than the others, and produces a good crop of forage when young, and the prickly seed-envelopes are not quite so bad as the others.

The Nut-grass, Cyperus rotundus, is a great plague here in cultivated grounds. It is not a true grass, however, but belongs in the vast family of Sedges. The members of this great order are usually harmless, and mostly useless, except to beautify the earth, often growing, as they do, luxuriantly where other things refuse to thrive. This Nut-grass is said to come from the more southern states, but I am sure that it must be indigenous here. At all events, ever since the settlement of Vineland, it has been a pest in cultivated grounds. It is distributed both by seed and by small potato-like tubers, which are produced on long, slender root-stocks running out from the plant in every direction, which in sandy soil reach a yard or more in length, and the plow and cultivator help to distribute the pest by breaking the runners and scattering the tubers, when each will make a new plant if not constantly kept in check.

I subjoin an extract from an article sent out by the Government on the best means of eradicating Coco, as this pest is sometimes called:

The plan of campaign to extirpate Nut-grass is simply to prevent it maturing seed above ground. Nearly everybody thinks that the nuisance reproduces itself from the nut alone, whereas it propagates a thousand times more from the seed. Hence, to effectually and quickly destroy Nut-grass on any land infested with it, the soil should be frequently stirred during the grow-

ing period of summer so as to stimulate each nut tuber and seed to sprout. It is a waste of effort to attack Coco in winter, either by digging or plowing, or turning hogs on it. The best time for fighting it is between midsummer and frost time. Although myriads of the sprigs will show themselves above ground in a day or two after each working of the soil, even in the spring months, yet no seed-stem will shoot up till late in the season, and the secret of success, as before remarked, is

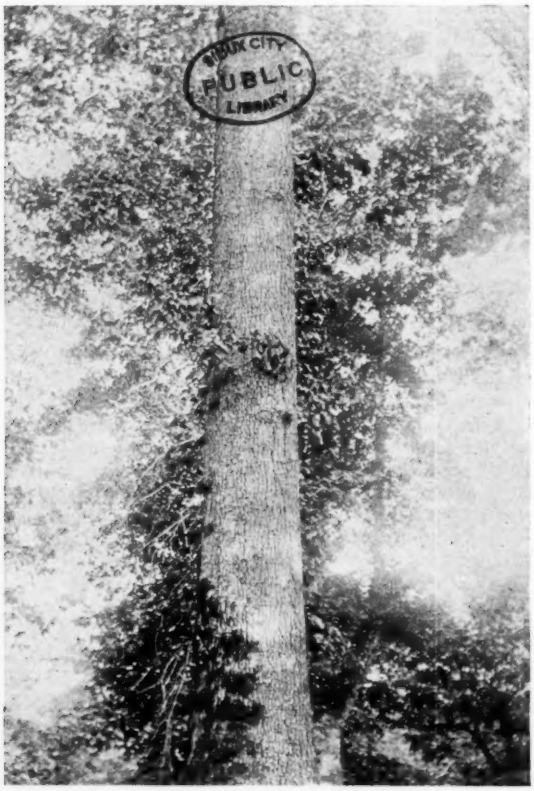
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Fig. 16.—Spanish Oak, Quercus digitata.—See page 101.

merely to cut down every tall stem, while in the flowering stage at the latest, and the sooner the better. The old method for destroying Coco, by cutting it off under the surface of the ground every time a sprig appears above the surface, is a useless expenditure of labor. The ground should be often stirred with the plow or hoe, from April to frost, as before mentioned, to make every nut and seed come up if possible, and as soon as possible, but there is no urgent necessity, as far as eradicating the grass is concerned, to kill its sprigs until they begin to shoot up seed-stalks. For this purpose it is only requisite to plow or chop down the grass at the regular intervals of working Indian Corn, Collards, or any other crop. Still it is advisable to plant the land in some tall-growing crop which shall neither cover nor obscure the Coco seed-stems, and thus keep them from being observed and destroyed. By the above method two years are ample time in which to rid any ground of Coco. In fact, one season is sufficient to eradicate it, except that a few scattering sprigs will show themselves in subsequent years, which can easily be prevented from going to seed by close attention. One cause that has enabled Coco so long and so defiantly to hold its sway in the south is that we have so few crops which are hoed or plowed in the fall of the year. This, together with the popular error that Coco propagates from the nut alone, explains the whole story of its universal triumph over the patience, sweat, curses and blows of the millions who have warred on it.

Vineland, N. J. *Mary Treat.*

Plant Notes.

Kerria Japonica.—A recent number of *The Garden* speaks of the cheerful green tint of the long slender branches of Kerria Japonica in the winter-time. We can add that what is true of this plant in the soft climate of England is equally true here, where the yellowish green stems of the Kerria, better known here as the old-fashioned Corchorus of our gardens, rival the Willows and Cornels in their pleasing effects, especially when they stand out in contrast to the drab or dead brown of many other shrubs. The double-flowered form of this Kerria, which is closely allied to the Pearl Bush, or Exochorda, has long been a favorite in country gardens because of its easy propagation, its ability to endure considerable shade and to the fact that it bears a few scattered flowers occasionally all summer long. A much more beautiful shrub is the rarer single-flowered form, the flowers of which are nearly an inch and a half across, and produced singly on slender stalks, where their five bright yellow petals and numerous long stamens are seen to first-rate advantage against the light green foliage. This was one of the first plants ever introduced from Japan, and it is still among the very best. As we have said, it is beautiful in winter, beautiful in early June with its bright flowers, and in early November it is one of the most distinct ornaments of the shrubbery, when its foliage turns to a clear sunny yellow, which is unsurpassed. In good ground the Kerria attains a height of six feet or more, and it becomes as broad as it is high. It is perfectly hardy in this latitude, although farther north the ends of the branches are sometimes killed in winter. The single-flowered kind is quite superior to the other, but, for some reason, it is seldom seen in shrubberies, and, indeed, until recently it could hardly be found in American nurseries.

Symplocos cratægoides.—A correspondent inquires the name of the Japanese shrub with blue berries. There are species of Viburnum, Vitis and other genera with fruits more or less blue or purple, but perhaps the plant sought for is Symplocos cratægoides, or, as it was formerly called, Symplocos paniculatus, a hardy shrub sent to this country from Japan nearly a quarter of a century ago and distributed by Messrs. Parsons, of Flushing. Though it has been known so long it is still by no means a common inhabitant of our gardens, although its clean foliage, graceful flowers and almost unique fruitage ought to command a place for it in every considerable collection. It was figured in Garden and Forest, vol. v., page 89, where the white flowers, each less than half an inch across when expanded, and borne in short loose panicles, and the racemes of fruit each one being the size of a pea, and borne on the last year's growth, are well shown in Mr. Faxon's drawing. But what gives the plant its singular value is the deep ultramarine blue color of its fruit, which is borne in great abundance. It is a broad tree-like shrub with dark green leaves, softly pubescent on the under side, and which have so far in this country been free from the attacks of insects and fungi.

Diplarrhena Moræa.—This is an interesting Tasmanian Iridaceous plant with curious habit, which bears very pretty flowers. The plant has narrow leaves, which grow in clusters, and increases by new shoots from its short creeping rhizomes. It also throws out thin wiry stems from the bases of the clusters, and on these flowers are borne singly, but in frequent succession. These stems, which are not larger than an oat-straw, keep growing in length, and finally produce new plants. Mr. Endicott, in an early number of Garden and Forest, spoke of a stem that had grown to a length of ten feet in his greenhouse. The flowers are charming in appearance, but very fugacious, lasting at most only a few hours. They are Moræa-like in form—nearly flat. The large segments are white, with orange spots; the small segments are white and narrow. The stigmas form a purplish central crown. The flower is about two inches in diameter, and is followed by seeds borne in long-pointed three-sided capsules, the planes of which are concave. As will be seen, this plant is readily increased. It offers no difficulties in cultivation, and there are few greenhouse plants which will survive more neglect, as it seems insensible to drought.

Jatropha podagrica.—This is an interesting euphorbiaceous plant from New Guiana. Cassava and tapioca are made from the roots of some species of Jatropha, but this

one is noteworthy for its curious stem and the peculiar arrangement of its flowers. The plant grows readily from seed, and has a gouty stem, about a foot and a half high. The goutiness appears at the top, the stem being crudely described as like an inverted ten-pin. The smooth leaves are five-lobed, four or five inches across, and usually disappear late in the year. The flowers are borne from the top of the stem on short peduncles, and are small bright coral red, and in racemes irregularly arranged, so that the effect is of a bunch of coral. Well-established plants flower frequently, whether the plant is leafless or otherwise.

Cultural Department.

Germination of Black Walnuts and Acorns.

MR. JACK'S articles in GARDEN AND FOREST (vii., 135; viii., 6) on "Patience with Germinating Seeds," and "Germinating Nuts and Acorns," recall an interesting observation lately made on the retention of vitality in black walnuts. So far as I know, the behavior of this seed appears to be quite phenomenal. As a rule, the mature fresh nuts of the Hickories and Walnuts planted in the fall, or, after proper care during the winter, planted in the spring, germinate during the first season, not "lying over" and germinating the second, as is sometimes observed with other less bulky forest-tree seeds (Robinia, Gleditsia, Gymnocladus, Acacia, Fraxinus, etc.)

In March, 1893, ten bushels of black walnuts were planted under the direction of the Division of Forestry, the nuts having been kept during the preceding winter spread out in a thin layer on the ground, with a light cover of débris. The soil was a slightly loamy sand, and when planted the nuts were covered to a depth of from two to four inches. Within ninety days after the planting, a large percentage of the nuts germinated and the plants made a vigorous season's growth. One year from the planting (March, 1894), in taking up the seedlings, eighteen to twenty nuts were found, in different rows of the plantation, in various stages of germination, the radicles being from one-quarter to three inches in length, all in a perfectly vigorous state. When found, the nuts were covered to a depth of from two to three inches.

Professor W. J. Beal has recorded * some observations which are interesting in this connection. In addition to a number of weed seeds, deeply buried in sand for ten years and then uncovered in order to test their vitality, he mentions the burying also of black walnuts and Black Oak acorns at depths varying from a "few inches" to three feet. Some of the nuts and acorns within a few inches from the surface of the ground germinated the first season; all the acorns at a depth of eight inches to two feet were decayed; a few acorns at a depth of two to three feet were found to have germinated, and the aborted plantlets were still alive at the end of nearly four years. But all of the black walnuts buried from eight inches to three feet deep were decayed, there being no indication of germination as in case of the acorns.

The greater ability of acorns to preserve their vitality for a limited time in a quiescent or germinated state when deeply

Fig. 17.—View in the forest on the bottom-lands of White River, Indiana.—See page 101.

* *Proc. Soc. Prom. Ag. Sci., 1889*, p. 15.

buried was further well demonstrated in the planting of five bushels of Cork Oak acorns (Quercus Suber) by this Department in 1892. Through carelessness in planting—the acorns being plowed under contrary to instructions—many of them were buried to a depth of six to eight inches; and while a larger number were decayed at the end of twelve months, one in about every dozen was found to be either in a fresh state or with germination more or less advanced. The ascending axis was in no case, however, much developed, the main energy being exhausted in the production of large radicles.

Professor Beal does not state how many walnuts he buried, but presumably the quantity was small and, perhaps, not sufficient to indicate the retentativeness of vitality in the species which appears to be fairly well shown in the case of the Department plantation. The explanation of the long retention of vitality in the case of these black walnuts must, doubtless, be found in an accidental but proper adjustment of moisture conditions—dependent upon the season and character of soil—conditions which, in all cases, have much to do with the behavior of all planted seeds.

Department of Agriculture, Washington, D. C. *Geo. B. Sudworth.*

A Few Annuals.—II.

SWEET ALYSSUM is one of the best-known annuals for a front border, and it has a dainty beauty but is not as fragrant as its common name would seem to indicate. A dwarf form, Tom Thumb, has lately been introduced, and makes good compact-growing plants. The variegated Sweet Alyssum can only be increased by cuttings. Seeds of Sweet Alyssum planted in the open are quite certain to germinate, and the plant will often perpetuate itself by self-sown seed. There are several hardy Alyssums, mostly yellow, and these are excellent for borders; the best is probably A. saxatile, which in the early spring is cheerful and attractive. This sort may be bought of the hardy plantsman, as seeds do not germinate readily.

Candytuft (Iberis) is a hardy annual, which may be sown in the fall in a warm garden. This flower, in its shades of white and mauve, is pretty in the borders, but only one crop of these is produced, and this is soon over. As these flowers are in umbels, they are not especially useful in floral arrangement. The hardy Candytufts are easily established, and are among the best of trailing, half-shrubby perennials, bearing flowers of the purest white for many weeks.

The Balsam, Impatiens, is one of those plants concerning which every seedsman takes especial pride in declaring that his strain is sure to produce double-flowered kinds. With all their beautiful pure colors and their old-time associations they appear to me unpleasant plants owing to their fleshy stems. One of the prettiest bedding effects I have seen was made with Impatiens Sultani with a border of silver-leaved Centaurea. This Impatiens requires warmth and careful treatment of the seed, though it is easily increased by cuttings.

The single annual Chrysanthemums are pleasing plants in the garden, although the flowers and foliage are rather soft for cutting. The flowers are mostly yellow or creamy white, with dark eyes. The plants are thrifty, and one and a half to two feet high, and continuously in flower.

The annual and biennial Larkspurs require less space than the hardy perennial kinds, but the latter are so much more effective that the annuals and biennials are not much valued in gardens now. I seem to have omitted Forget-me-not, Myosotis, from both of my former lists, but I should not forget to give it a place in my garden. The Forget-me-not is not only a flower of sentiment, but of dainty beauty. It is of the easiest possible culture. None of the varieties are prettier than M. palustris, which has escaped from cultivation, as the botanists say, and is now found at home in moist places everywhere. It is, however, a rather sprawling species, and for the garden M. dissitiflora is one of the best. M. alpestris Victoria is also a fine kind, very compact and floriferous, but with short stems. Although Forget-me-not requires much moisture, this should be at the roots, and not near the leaves, which rot if exposed to wet. Their small shining black seed germinate readily, but the seed-bed should be shaded.

One cannot have a complete old-fashioned garden without Four-o'clocks, Mirabilis, with their sweet-smelling flowers so strangely opening to greet twilight wanderers in the garden.

Nicotiana affinis is a hardy annual which will perpetuate itself in the garden from self-sown seeds. It is a tall noble-appearing plant, with leaves decreasing in size from the base upward. The large white flowers, with long tubes, open in the early evening, and are pleasantly fragrant. They remain open until the middle of the morning, and are capital for evening decorations. This is one of the last annuals to be cut off by frost.

Few packets of seeds will make a greater show in the garden than one of Petunias, and once established they will be happy there, for they are hardy annuals, great seed-bearers and every seed seems fertile. Perhaps the best all-round Petunia is the large-flowered white, which is apparently a distinct species. This is not only a good garden plant, but will do well in the house, where its fragrant flowers are very satisfactory. There are many bad faded colors among the Petunias, and they need careful culling. The Countess of Ellsmore was a great gain for a pure rose-color, but lately a new strain from California, of very large, curiously marked, fringed flowers, promises to supersede the old kinds. A strain of large-flowered, double Petunias has also become fixed, but to many persons these flowers, from their confused and lumpy character, are hardly worth growing.

Calendulas, Pot Marigolds, have already been mentioned, but there is another pretty kind of these known as C. fluvialis, which bears a single white flower with brown reverse. This is well worth growing, though of weedy habit, and, like all single Calendulas, closing at night or during cloudy days.

Phlox Drummondii is a pretty as well as popular annual in a great variety of colors. It is most effective in the garden when planted in separate colors, beds from seed mixed haphazard having no consistency or meaning, and are moderately useful for cutting. The general effect of these plants, unless they are well grown, is ragged.

Portulacca will thrive in dry borders in full sunshine, where few other plants will survive, and are certainly showy, though there is always a suggestion of Pusley attached to them. They are tender annuals, and the seed will not germinate without considerable heat.

Salpiglossis has curiously shaped and oddly marked flowers, not very showy or pure in color. One season's trial of this plant will satisfy most gardeners.

Spherogyne speciosa is an old annual, not as generally grown as its merits deserve. It is a yellow composite, with narrow ray florets, and the plant is of neat habit. Objection may be made that yellow-flowered composites are very plentiful and one would preferably grow those which are of the readiest culture; still Spherogyne offers no difficulty, the seeds germinating readily.

Ten Weeks Stocks are great favorites in some gardens and with some florists, the double sweet-scented white flowers being lasting and useful for floral work. But there is a suggestion of lumpiness about the flowering plants, both in the garden and when used for bouquet work. Seeds of fine double Stocks are apt to have delicate germinating powers and they require careful attention to make them germinate.

Swan River Daisies are small plants with delicate, finely cut foliage and small blue flowers, which I always enjoy seeing in the garden. They are pretty in a front border and are sometimes useful in a delicate floral arrangement. In spite of their almost minute habit they are easily grown and the seeds germinate readily in the border.

Elizabeth, N. J. *J. N. Gerard.*

Bulbs for Spring Planting.

AMONG bulbous-flowering plants for spring planting, the Tiger Flowers are an important group. Those most commonly offered by American dealers are varieties of the Peacock Tiger Flower, Tigridia pavonia, a native of Mexico. Among the varieties are Grandiflora, Grandiflora alba, Conchiflora, Speciosa, Grandiflora rosea and others. The three most distinct varieties are Grandiflora, in which the leading color is crimson; Grandiflora alba, principally white; and Conchiflora, orange-yellow. There are other intermediate forms in which these colors vary, all of them very beautiful. Indeed, it would be difficult to imagine a variety of the Peacock Tiger Flower that is not beautiful. The flowers of these, as of all Tigridias, are short-lived, but they continue to come, day after day, and under favorable conditions until autumn frosts kill the buds. One great point in favor of this class of bulbs is that they are cheap. They increase fast by division, and even as far north as Vermont, when the frosts hold off late in the autumn, they mature sufficiently to be wintered and flowered the following year. They need to be kept in a warm dry place; in a cellar they generally decay before spring. The soil best suited to these bulbs is a warm sandy loam, with good drainage. They need plenty of moisture until after flowering, and in a dry season this must be artificially supplied. The bulbs should be planted deeper than most bulbs of their size.

Other species of Tigridia are cultivated, but they are not so striking or showy as these. T. Van Houtteii has lilac and pur-

ple flowers, a little more than an inch wide, borne in great profusion, not rarely thirty flowers from a single bulb. This species is one of the easiest to grow, but the flowers are not very striking and make a poor showing by the side of a variety of T. pavonia. The flowers of T. Dugesii are still smaller, and scarcely an inch wide; they are nearly white, tinged with violet or purple.

One of the most desirable of the smaller bulbous plants of this class is what is sometimes called Tigridia Herberti, but which, though of the same natural order, is not a Tigridia, but a Cypella, a native of Buenos Ayres. It closely resembles the Tiger Flower and thrives nicely under the same treatment. The flowers are an inch wide or more, yellow, varying from light to a darker shade, and the plant is increased by division.

Until last season I found Bessera elegans a difficult bulb to grow. The trouble was in the drainage. It needs a light loamy or sandy soil and the driest possible place. I doubt if it is possible to give this plant too dry a place. Of course, it needs to be reached by rain, but the moisture should drain off as fast as possible. In such a place I had perfect success, and the bulbs were monsters as compared to the collected ones. It blooms earlier than the Mexican Star Flower, Milla biflora, and is, on this account, more sure to ripen in our short seasons.

Milla biflora has bulbs similar to those of the Besseras, but the plant is quite unlike it in many ways, and although the scarlet drooping flowers of Bessera are pretty, the much larger pure waxy-white ones of the Milla are, to my mind, much handsomer. They are more durable, and on long, naked stems well suited for cutting. The Milla is not so difficult to grow, and any good garden-soil will suit it.

Charlotte, Vt. *F. H. Horsford.*

Notes on Violets.

WITH the lengthening days and increasing sunlight, Violets grown in cold frames are now blooming profusely; the flowers are much superior in quality to those produced after this time in greenhouses, as these are now coming small, pale and showing signs of exhaustion. As the time for severe frost is probably past, the leaves which have been packed round the sides of the frames can be removed and utilized in making hot-beds; it will not be safe, however, to dispense with mats and shutters, in this latitude, at least, before April 1st. More frequent waterings will now be found necessary. Violets are more often injured by too little than by too much water. A little liquid-manure can advantageously be used; an application once a week during the remainder of the flowering season will be helpful. As the midday sun is now strong, some shade should be given to the plants for a few hours every day. Lath shadings are good for this purpose, but if these are not at hand a light coating of lime-wash should be applied to the glass. This shading keeps the plants cooler, and Violets dislike a high temperature. We find that the flowers come of a deeper color and last much better when grown in shaded frames than when exposed to the direct rays of the sun. Air must be freely admitted, for no plant resents coddling more than the Violet. Runners are now being produced quite freely; the best of these can be taken off and dibbled quite thickly into boxes of sandy compost, care being taken to secure stock from the healthiest and most vigorous plants.

Lady Hume Campbell is not a satisfactory winter bloomer in cold frames with us, and it appears to require more heat than Marie Louise, which blooms freely all winter long, and up till March 1st had given ten times as many flowers to plants as the Lady Campbell; the last-named sort is now flowering abundantly. As grown by Mr. H. Nuebner, of Groton, Massachusetts, this variety is superb, and with most growers it has been a success. It cannot be called disease-proof, however, as we have during the present winter seen two or three establishments where it had been quite wiped out by the leaf-curl.

Where Marie Louise can be grown well it is still ahead of all its competitors. The new Farquhar promises to make a strong bid for popular favor. Some three weeks ago I visited the greenhouses of the Messrs. Farquhar, in Roslindale, Massachusetts, to see the new variety at home, and looking over the whole stock saw no trace of disease. Every plant seemed in perfect health; the flowers were of good size and borne on long stems. The color is similar to that of Marie Louise, although the distributers of the plant claim that it comes even darker. It more nearly resembles Marie Louise than Lady Campbell, although it seems quite distinct from both in habit when a batch of the two is seen together. Mr. Farquhar pointed out a number of plants of their new kind planted among the diseased stock, which were perfectly clean, and yet we have no idea that it will be proof against disease.

Among single Violets it is still hard to beat the Czar. One or two other kinds produce a few more flowers, but they are of greatly inferior quality. Wellsiana is a fine kind, but produces runners sparingly, hence is increased slowly. The new California will be quite extensively planted next fall; so far as we can judge from flowers on young plants received, it is very similar to the Czar, but if it produces flower-stems of the size and quality claimed and proves a satisfactory winter bloomer, it may eventually supplant that good old variety.

Taunton, Mass. *W. N. Craig.*

New Grapes.

THOSE who are looking for new grapes of high quality may safely select the Alice, which keeps well in common storage until March. It resembles Diana more closely than any other grape I know, but the color is more like that of Catawba. The flavor is sweet, and the skin lacks wholly the unpleasant tang left by Catawba. In the size of cluster and in general appearance Alice is much like Delaware, but the berry is fully as large as that of Catawba. The skin is tough, and dries like that of Diana, without rotting, and the grape is sugary, qualities which suggest that it would make good raisins. The seeds are small, and there are not many of them. It ripens about September 20th to September 30th. Growers of this Grape report that the wood is hardy and matures well, and that its foliage is heavy and the canes strong.

Mr. George C. Campbell, of Delaware, Ohio, the veteran Grape-grower of the United States, has a seedling which ripens early, the grapes being large and black. This new sort has not yet been sent out, but one more really good Grape may safely be counted upon.

Of the Concord seedlings and other recently introduced early or late white sorts, Colerain seems to me the best. It is one of the earliest, ripening about the last of August. It has few seeds, and these are small, and medium-sized bunches of good-sized berries. The color is greenish white, with a fine bloom. The vine is a strong grower, and it is altogether hardy.

Points which all new Grapes should include are short-jointed wood, berries of good size, adherence to the stem after ripening, small and few seeds, uniformity in ripening. Of course, quality and quantity will be demanded. An otherwise excellent Grape, the Diamond, is lacking in uniformity of ripening, and it is altogether uncertain whether it will mature by September 10th or not until a month later. Many of Rogers' seedlings are, like Lindley, too long-jointed.

Clinton, N. Y. *E. P. P.*

Early Flowers.—The winter season just closing was remarkable in this locality for continued low temperature. From Christmas until the end of February there was seldom even a superficial softening of the ground on sunny days, and there were no nights without a freezing temperature. Under these conditions winter flowers made no progress, and Snowdrops, which were showing color in the middle of December, made no advances until the slightly rising temperature of the first days of March allowed them to expand. Now Snowdrops are daily becoming more plentiful, and the first of the Scillas are showing color, while the earliest Crocuses are in bud.

The Snowdrops in flower at present are Galanthus imperati, Atkins' fine variety, and forms of G. Elwesii. The newer forms, G. Aidin, G. Cassaba, G. globosus and G. unguicularis, are as forward to flower as the type. The scorching cold has burned foliage not affected in ordinary winters. The leaves of Oriental Poppies have been cut off, and Primulas are mats of brown leaves. Some of the early Irises have lost their foliage, while others are fresh and untouched. The vagaries of frost are past finding out.

Elizabeth, N. J. *J. N. G.*

The Columbian Raspberry.—From my experience with the Columbian Raspberry I have found that the stalk is sometimes as large as a stout staff and the general growth is very luxuriant. The fruit is more dry than that of the Schaffer, and will both ship and can better. It is more nearly a purple than a red raspberry, but the color is brighter than that of Schaffer in the dried berries. The yield is enormous. It is unquestionably a cross of Blackcap and Red Raspberry parents. My seedlings of Schaffer almost all came black, and they are subject to the same disease that affects our black Raspberry—an anthracnose—the same disease which put an end to growing the purple Rochelle and which threatens to kill out the Schaffer. It is a mistaken prejudice with the majority of buyers to prefer red raspberries for all uses, but for home use I think the Columbian a decided acquisition.

Clinton, N. Y. *E. P. P.*

Correspondence.

The Gypsy Moth in Massachusetts.

To the Editor of Garden and Forest:

Sir,—This statement relates to about thirty-three acres of land in three separate parcels, all located in Medford, Massachusetts, and in the section described by the Gypsy Moth Commission as infested. It is about three-fourths woodland, with the remnant well sprinkled with Apple and shade trees.

Finding that all his force would be likely to be fully occupied elsewhere, the field superintendent kindly gave me permission, last spring, to take charge of this land myself for the purpose of suppressing and preventing the multiplication of the moths upon it, and, if possible, exterminating them. For this purpose a good supply of burlap and creosote-oil was given me.

The work has been done at odd times by myself, my daughter and a hired man; and we are satisfied with the result as evidence that the gypsy moth, like most other noxious insects, may be reduced to harmless proportions, at small expense, by all private land-owners who choose to attend to the matter for themselves. Indeed, the expense and trouble is so small, and the result so satisfactory, as to prove that it would seem a simple waste for the state to be at further expense, and cause much private annoyance, by continuing the work of the commission with the aim of absolute extermination, instead of confining its efforts to the suppression of the insect from year to year on public grounds, in coöperation with their custodians, and on neglected private premises, besides the reasonable inspection of private grounds cared for by the owners, with their knowledge and in their presence, or that of their authorized agents.

We destroyed from 10,000 to 12,000 caterpillars in their season, and have since found and painted with creosote-oil about 115 patches of eggs. Fully half of these were under stones on the ground, and nearly all could be reached without climbing. Some ground now covered with snow is yet to be searched. While it is very improbable that no bunch of eggs has been missed where search has been made, it is very certain that those missed are too few to be a material harm. Not a tree or bush on our premises was noticeably stripped of foliage by the moth during the season. No trees were burned, marked or marred by them, and all burlap used was taken down and burned at the close of the season. We have enjoyed the privilege of helping ourselves, and hope we may be allowed to enjoy it in future.

The commission, as a branch of the work of the State Board of Agriculture, has a permanent use and value, especially if clothed with enlarged powers to cover all sorts of rapidly multiplying, and therefore noxious, insects. But we believe that function should be exercised in harmony with private wishes, but never in private grounds except at private cost.

Medford, Mass. *Walter C. Wright.*

The Meeting of the American Carnation Society.

To the Editor of Garden and Forest:

Sir,—Allow me to add some notes to your account of the meeting of the Carnation Society in Boston. The first thing to strike the visitor was the large proportion of recent varieties in the exhibition and the absence of the old kinds. The object of the raisers and growers seemed to be primarily a stiff stem and, by means of disbudding, large flowers, but the lack of a good stem outweighs every other good quality, and, therefore, many of the old sorts, no matter how beautiful they may be, unless they yield abundantly and are borne on strong stems, have little chance in the race. And, really, this is a proper line of selection. Objection has been made to the practice of disbudding, and there are æsthetical people who would rather see smaller flowers and the buds remaining as they are in nature, but, after all, a Carnation cannot be made ungraceful even by extreme disbudding, as a Chrysanthemum can be when similarly treated. Among the whites old varieties are practically gone. Mrs. Fisher and Lizzie McGowan are comparatively recent, but they are grown only in the east and in separated districts. Silver Spray is the favorite white of the west. Anna Webb still holds a leading position among the crimsons. Jacqueminot and the Stuart (red) were not shown well, even by their introducers, but they both have the great advantage of a good stem. Among the scarlets I still like Portia, because of its healthy abundant bloom and its perfection of form. It has the demerit, however, of being small. A scarlet Carnation with a flower as large as that of Hector, but with all the other good qualities possessed by Portia, would be an acquisition. As far as simple flowers were concerned Hector was pronounced the best scarlet exhibited, but it has the great defect of a feeble stem. The striped Helen Keller, unique in its class and magnificent in its form, is not only a Carnation of the best type, but it stood the test of two days' exhibition better than almost any variety in the exhibition. It was whispered that these flowers were cut before they were quite matured, and this may account, to some extent, for its holding so well. If this is true, why should not exhibitors act upon it? Some may have failed because in their anxiety to secure the fullest development of their flowers they allowed them to remain on the plant too long. The eastern exhibits went down badly on the second day. It was held by some that this was caused by overfeeding. These are points certainly worth studying and settling.

The old yellows are out of date, and such varieties as Buttercup and Bouton d'Or are the principal ones grown. Success with each of these depends much on local and special conditions, and there are a few growers who have mastered these conditions so well that they have the field almost to themselves. Many good Carnation growers find these varieties hard to propagate. President Dailledouze starts his plants early and gets a long season's growth, and from my experience this seems a good way to treat all yellow-flowered Carnations. The Buttercups exhibited by Mr. Southworth, and the Bouton d'Or by Mr. Dailledouze, were certainly remarkable.

The seedling table, devoted to varieties not yet distributed, was always surrounded by growers who came to select novelties. Every one must agree with what was said by the President about the advantage of having plants as well as cut blooms exhibited, for, otherwise, it is impossible to get at the character of the varieties. Storm King was the best white, in my opinion, although it is not very fragrant, but Alaska had many admirers, and those who have seen it growing declare it has all the qualifications of a good commercial variety. The flower is good in form, with a good calyx and stem, and pure in color and very fragrant. Della Fox looked promising the first day, but it folded badly on the second. It is of the most delicately shaded salmon-pink in the way of Daybreak. Triumph was a most promising new pink, resembling its parent, William Scott, and it stood the test of two days' exhibition even better than that good plant, and it had a better stem. Sylphide, a delicately tinted pink, also stood up well. Lena Saling was the best rose-pink on the first day, but it wilted on the second. Isabella Hunnewell, red-striped on a yellow ground, attracted much attention on account of its distinctness. The purest yellow shown was Henrietta Sargent. The flower is slightly undersized, and so far the plant has not been very productive. Eldorado, a picotee-edged pink, on a yellow ground, was, to my thinking, the handsomest in this class. It was finely fringed, which is an important qualification, and it stood the heat well, although it has not the best of stems. If a stem can be too good, Jubilee has this drawback. The stems of some of the flowers were so strong as to be rigid and ungraceful. It is an exceedingly bright scarlet, although the flower has not the best of forms. Perhaps the most distinct seedling of all was Maud Dean, which is quite a new departure, the petals being suffused with a color which may be called violet, deepening to the base. The form is perfect, and it lasts well.

By the way, the second prize for the best hundred white flowers was won by a seedling of Mr. Nicholson, and not of Mr. Chitty, as stated in your last week's report.

Boston. *R. A.*

The West Coast Spring.

To the Editor of Garden and Forest:

Sir,—While the days are growing longer and February is relaxing its icy hold on the Atlantic states, the West Coast is in the full tide of its growth and beauty. Broad fields of grain stretch away in billows of green—not the dark blue green of New England grain-fields, but a bright sunny green born of a kinder climate. The uplands are wrapped in varying shades, from the almost golden-green of the pastures and wheat-fields through the deeper tones of the Laurels and Bays, the still darker ones of the Live Oaks, up to the dusk of the thickets on the mountain sides. The deciduous trees are putting forth their tender leaves, wild flowers are everywhere and in every color, and give tint to the whole landscape. In the orchards the Almond-trees are all shimmering with a mauve-colored veil of blossoms, the Peach-trees are beginning to open, and brown buds of Plum, Prune, Cherry and Pear trees are swollen to bursting, while among the trees the ranchmen are turning up

red furrows and cattle stand knee-deep in clover. Through open windows we look across the broad Santa Clara valley, where occasional gleams of white show the clustered buildings of the ranches, with the steeples of the town of San José, ten miles to the north-east. At the further rim of the valley is the line of the foothills with their varying opalescent colors as the shadows of the clouds chase over them, and above these are the ragged peaks of the Coast Range, with Monte Diablo, dim and cloud-like, fifty miles to the northward. While we read of the wild weather of the east, stormy seas and snow-covered earth, we have balmy air and singing birds and blossoming flowers in the most delightful season of the year on this coast.

Los Gatos, Calif. *I. E. Johnson.*

The Preservation of the Colors of Dried Flowers.

To the Editor of GARDEN AND FOREST:

Sir,—In your issue for March 6th I notice your London correspondent's remarks on the drying of flowers by means of heat, in order to preserve their colors. I can thoroughly endorse the utility of this method, as I have used heat for all dryings which I have made, and with most satisfactory results. I struck upon the idea quite accidentally some seven or eight years ago.

New York. *Leonard Barron.*

Flowering Branches of Viburnum lantanoides.

To the Editor of GARDEN AND FOREST:

Sir,—On one of the coldest days in February I received a package by express, and after the removal of several layers of thick paper, masses of large showy flowers were found carefully wrapped in cotton, and suggesting that it was summer-time somewhere. At first I thought of the Flowering Dogwood, but when they were fully uncovered I recognized them as the large cymes of the Moosewood or Hobble-bush, Viburnum lantanoides. The summer and autumn aspects of this tree are very familiar to many persons, but as its flowering-time is in late May, the flowers are not so generally known. This plant was figured in GARDEN AND FOREST, in vol. ii., page 535, and is there described as the handsomest of the native American Viburnums, and one of the most beautiful shrubs of our flora. The flowers I had received came from Cherryfield, Maine. The bare twigs had been cut and placed in water and set in the house for a fortnight, when they expanded into the flowers which I had received. No attention was given them except to remove them from the direct rays of the sun in the middle of the day. I have often seen branches of our spring-flowering ornamental shrubs and fruit-trees coaxed into bloom after this fashion, but certainly nothing of the kind equals in effectiveness this native wilding, with the hydrangea-like corollas of the neutral flowers on the margin of the cyme an inch or more across.

Andover, Mass. *A. S. D.*

Recent Publications.

The Wild Garden. By W. Robinson. Illustrated by Alfred Parsons. Fourth edition. London: John Murray.

In the preface to the new edition of this book, which has become a classic among those who are interested in naturalizing hardy plants from other countries, the author tells us that it is more than twenty years since the first edition saw the light. He adds that during all these years his experience has gone to confirm his faith that where the original purpose of the book is carried out with due regard to soil and other surroundings of the plants, the open-air gardens of England may be made more artistic and delightful. The Wild Garden, as it is understood in this book, is not a careless and neglected tangle, nor is it the result of sowing the seeds of annual flowering plants in a haphazard mixture. Its controlling idea is the introduction of the plants of other countries which are as hardy as the hardiest of native common flowers in places where they will flourish without further care or cost. It has, therefore, nothing to do with what is often called a "wilderness," nor can it be confused with a picturesque garden, nor does it interfere in any way with the regulation flower garden. Judging from his own effort and experience, Mr. Robinson has achieved his highest success in the establishment of early-flowering bulbs in the turf of fields mown for hay, where, without interfering with the value of the crop, blue Anemones, Snowdrops, Dogtooth Violets, Fritillarias, Wild Honeysuckles and Tulips bloom in the most natural way and have the most effective setting. The mountains of central Europe, Greece and Asia Minor furnish plants which blossom earlier than those of England, and, therefore, in warm soils which are sheltered by groves and banks of evergreens, the meadows which stretch about nearly every English country house can be made bright with early bloom. But the book deals as well with native flowers, and one of its most delightful chapters is that on British wild flowers and trees. But there is no need of enumerating or characterizing the contents of a book which is, perhaps, as well known as any other work on ornamental horticulture in the language. The very names of the chapters are suggestive of the wildness and freedom and natural charm of the scenes which Mr. Robinson describes and of the compositions he suggests. The art of Mr. Parsons is always delightful, and all his illustrations are engraved on wood, and have an effectiveness and finish which can hardly be excelled in works of their class. Mr. Robinson promises that in future editions some ideas of the book, which are as yet only in the type, may be seen more clearly in new illustrations, so that the reader may gain a clearer knowledge of what the author means when he speaks, for example, of the possible beauty of hedgerows and grass walks.

Of course, many of the cultural directions do not apply to plants in our climate, and many of the plants which thrive in English gardens would never become naturalized here. Nevertheless, the pictures and the text are both instructive and stimulating, and will suggest experiments which cannot fail to bring pleasure and profit to any one who undertakes them.

Notes.

Sunday last was the first really spring-like day of the year in this vicinity, and under its genial sunshine some of the Crocuses expanded for the first time. Crocus Imperati, the most robust of those we saw in a small collection, had fully opened its rosy purple segments and yellow anthers, while C. biflorus, equally early, but not as showy, was quite attractive with its lilac and white segments and orange-colored anthers.

The Sweet Pepperbush, Clethra alnifolia, is an excellent native shrub with a peculiar value, from the fact that it shows its long spikes of pure white flowers and yellow anthers late in summer, when it has few rivals in the field. In the last number of *Meehans' Monthly*, one of these shrubs on the editor's home grounds is described as fifteen feet in diameter and twelve feet high at the age of twenty years. With the delightful fragrance of its flowers, in addition to their beauty and attractiveness to honey-gathering insects, it is a charming ornament in its season.

Catawba grapes from New York state may still be had in fair condition, a five-pound basket costing twenty-five to thirty cents. Almeria grapes continue moderately plentiful, and sell at thirty to fifty cents a pound, the pink-tinted fruit bringing the higher price. Hot-house grapes are always scarce in February and March, and the only fruit of this class now to be had here are small lots of Gros Colman from Belgium. These bring the fancy price of $3.25 a pound, but their dry stems and the tendency of the grapes to drop indicate the approaching end of their season. Black Hamburgs from Rhode Island are usually the first hot-house grapes seen here in the spring, and these will not be on the market before the first week in April.

The scale insects have not been very troublesome heretofore in the northern and eastern parts of the United States, but one of them has appeared in New York orchards, attacking Plums and other trees, and threatens to become a serious enemy. It may have inhabited certain orchards in small numbers for some time, but it never caused any alarm until within two years, and now it threatens the total destruction of thousands of trees. Mr. Slingerland, of Cornell University, has been making a study of this insect, and, although its life-history is not yet thoroughly understood, he has discovered enough to enable him to state that it can be destroyed by persistent spraying before spring growth begins. In an illustrated bulletin just issued by the Cornell Experiment Station, Mr. Slingerland explains how it can be distinguished from the San

José scale, and gives directions for treating the trees with the kerosene emulsion, so as to prevent it from getting started in April. The bulletin will be of great use to those whose trees are infested with this new pest if they will heed its instructions.

At the late meeting of the Carnation Society, in Boston, President Dailledouze stated that the cutting-bench fungus was more likely to appear when the benches were made of old boards. All the woodwork should be treated with a coat of warm lime before it is used. It was also suggested that sand more than two or two and a half inches deep was likely to harbor this fungus, since it did not dry out quickly. Mr. Chitty warned propagators against using the sand a second time, and other members stated that when it was necessary to use the sand over again it should be drenched with water which contained a minute proportion of carbolic acid. A solution of copper sulphate of the strength which is used in spraying would be equally good.

The last number of *The Gardeners' Chronicle* contains a good picture of the variety of Doronicum plantagineum known as Excelsum or Harpur Crewe, and recommends that after flowering in spring these plants can be taken up and planted in a reserve garden, so as to give room for other plants. We have often commended these hardy perennials for their beauty, and they have the advantage of being taller than most plants which flower in this season, and their large golden yellow ray-florets make very conspicuous objects. Plants of many of the Doronicums taken up in autumn and potted can be had in fine flower during late winter and spring, and if started in a cold frame even now they will make good decoration for the conservatory later on.

Professor Wiley, Chemist of the United States Department of Agriculture, has been making some investigations as to the possibilities of Sweet Cassava as an agricultural crop in the southern states, and he pronounces that it can be grown with safety and profit in the peninsula of Florida, and probably in the coast region of the other Gulf states. It contains so little ash and nitrogen that it will produce in poor sandy soils four or five tons to the acre, and the fresh roots will yield twenty-five per cent. of starch of a high grade, which can be used as a substitute for the starch of Maize. A superior tapioca can be prepared from the plant, and so can glucose, and it furnishes an excellent food for man and for cattle, although it is deficient in albumen. To make a well-balanced ration for cattle it should be mixed with one-fourth of its weight with cotton-seed oil cake.

Professor Budd, of the Iowa Agricultural College, writes that he fears the losses to the Orange groves of Florida are even more serious than has been stated. Of course, the present crop is all gone, but the fact that many of the Orange-trees remained leafless after deciduous trees had come into leaf seemed to indicate that they have received a severe shock. If cut back, Professor Budd thinks, they may start from the stubs, but their vitality may be too low to give paying crops of fruit. He adds that the trees which were cut back by the frost of 1886 have never paid for the space they occupied, and that many of them which did come into leaf the next April died during the following summer. Of course, time alone will reveal the full effects of this disaster and enable us to calculate the total loss. We hope, however, that Profesor Budd's view of the case will prove too gloomy.

When Layard first uncovered the ruins of Assyria he identified, among their sculptured ornaments, representations of grape-bunches, pomegranates, reeds and apples, and, with regard to the prominent object so frequently held in the hands of the chief figures portrayed on the bas-reliefs, he wrote that he "would not hesitate to identify it with the pineapple unless there were every reason to believe that the Assyrians were unacquainted with this fruit," and he added, "the leaves sprouting from the top prove that it was not the cone of a Pine-tree or Fir." As it is now well known that the pineapple is of American origin, Layard's doubt upon this point is confirmed; and Dr. E. Bonamia, in his recently published *Flora of the Assyrian Monuments and its Outcomes*, asserts his belief that the symbol represents a Cedar-cone, which was used in religious and royal ceremonials to sprinkle holy water. Illustrating his words with reproductions of the ancient sculptures, Dr. Bonamia also claims that he has identified among them figures of the Date-tree, the pomegranate, the fig, the banana, the Pine-tree, the melon, the Reed, the Lily, the Baobab and some daisy-like plant. But, perhaps, the most interesting of his suggestions is the one he makes with regard to the origin of that ornament, so familiar in heraldry and decorative art, which we call the fleur-de-lis. It has never been well established that this ornament was evolved, as its name implies, from an Iris-blossom; and Dr. Bonamia thinks that he has traced it back, not to any other flower, but to the Assyrian custom of tying a pair of horns to a Date-tree as a charm against evil spirits. Representations of these "luck-horns" are frequent on Assyrian monuments, and Dr. Bonamia argues that the way in which they are attached explains the origin of that fillet or cross-band, so conspicuous in the ornament called the fleur-de-lis, which, of course, has no prototype in the Iris or any similar flower.

Botanical science has sustained a fresh loss in the death of Mr. John H. Redfield, which occurred at his home in Philadelphia, February 27th. Mr. Redfield was born at "Middletown Upper Houses," now Cromwell, Connecticut, July 10th, 1815, and had nearly completed his eightieth year. He came from a pure New England ancestry, John and Priscilla Alden being among his progenitors. His father, William C. Redfield, at the birth of his son a country storekeeper, was a man of much more than ordinary intelligence, who became in after years a noted meteorologist, and made important discoveries in regard to the rotary and progressive movements of storms. The elder Mr. Redfield looked well to the school facilities of his district, and here the son's education was commenced. It was continued at Stamford, Connecticut, at the High School in New York city, and finally at a private school. While at the school in New York, to which city his father brought his family in 1824, a teacher strengthened his inherited love of scientific pursuits, by taking him with him in his country walks and instructing him in mineralogy. In this way also he acquired the love of botany, which distinguished him later. In the interval between his attendance at the different schools he heard Dr. Torrey's lectures on chemistry. In 1836 he became a member of the New York Lyceum of Natural History, and this intensified his boyish interest in the sciences already named, besides developing in him a taste for conchology. At this time, Dr. Asa Gray was librarian and superintendent of the Lyceum, and here began the friendship which became closer with passing years, and continued through life. In 1843 he was most happily married, and in 1861 he removed to Philadelphia to take a position in the large car-wheel works of A. Whitney & Sons, his father-in-law being the head of the firm. During these years his spare time was given to scientific pursuits, especially to botany, in which the order Filices was his favorite. He had been elected a member of the Academy of Natural Sciences in 1846, and now became a life member. In 1876 he was made a member of the Council and Conservator of the Botanical Section, and in 1879 Corresponding Secretary of the Conchological Section. A member of the Publication Committee in 1877, he became chairman in 1891. All these offices he held until his death. Retiring from active business in 1885, all his leisure time, when in the city, was devoted to the Academy, and more particularly to the botanical section, where, in the face of many obstacles, he accomplished a great work in the rearranging of the vast herbarium and in the proper mounting of a great part of it. During this period his summers were mostly spent on Mount Desert Island, the flora of which he studied in connection with Mr. Rand, the result being the excellent catalogue recently published by them. Mr. Redfield's published articles number fifty-four. Of these, forty related to botanical subjects or to botanists, twelve to conchology, one to meteorology and one to fossil fishes.

As a scientific man Mr. Redfield was held in high esteem by the leading botanists of the country. His friendship was sought and cherished by such men as Doctors Torrey, Gray and Engelmann and their successors. He was of great assistance to them by the excellent judgment he displayed in the notes he made upon the plants contained in the very important herbarium under his control, and in forwarding portions of them for inspection. The Academy of Natural Sciences will keenly feel the loss of his faithful and efficient services and of his many gifts of important sets of specimens; and not the less, his wise counsel in its ruling board. In botany, his name is commemorated by a beautiful grass of the western plains, the Redfieldia flexuosa. Mr. Redfield was of most genial and kindly address. No one gave a warmer or more sincere greeting to a friend, or showed better, on all occasions, the spirit of a true Christian gentleman. Honorable to the last degree, generous and kind in every relation of life, he was yet modest in character and diffident of himself. He was almost the last remaining of the old set of botanists, among whom he was honored as an associate and loved as a friend.